hospitalization claims was searched from January 1, 1995 to December 31, 2000 to identify patients. Healthcare utilization and associated costs were studied one year prior to the start of salmeterol therapy and one year after. Log transformations were done to normalize the data. Paired t-tests were performed to assess differences in asthma-related healthcare utilization and costs in the pre and post-salmeterol periods. **RESULTS:** Short-acting b_2-agonist utilization increased from an average of 7.63 claims (SD = 7.45) in the pre-salmeterol period to an average of 8.39 claims (SD = 6.73) in the post-salmeterol period (t = –2.34, p = .022) and the costs increased from an average of $217.56 (SD = 264.13) in the pre-salmeterol period to an average of $219.31 (SD = 231.65) in the post-salmeterol period (t = –2.30, p = .024). Inhaled steroid use increased significantly from an average of 3.36 claims (SD = 4.55) in the pre-salmeterol period to an average of 6.29 claims (SD = 4.26) in the post-salmeterol period (t = –7.87, p = .00) and the costs also increased from an average of $149.82 (SD = 234.10) in the pre-salmeterol period to an average of $313.50 (SD = 269.74) in the post-salmeterol period (t = –7.40, p = .00). Total medication costs increased from $559.74 (SD = 655.08) in the pre-salmeterol period to $1155.51 (SD = 604.70) in the post- salmeterol period (t = –8.27, p < 0.001). Total healthcare costs also increased significantly from $1356 to $2090 in the post-salmeterol period (t = –6.89, p < 0.001. **CONCLUSIONS:** The introduction of salmeterol increased overall asthma-related healthcare utilization and costs but this may have been due to increasing asthma severity in this population as indicated by the increased utilization of short-acting b_2-agonist and inhaled steroids.

PRP12

BONE MINERAL DENSITY LOSS AFFECTS ESTIMATES OF THE COST-EFFECTIVENESS OF INHALED STEROIDS IN ASTHMA

Paltiel AD[1], Fuhlbrigge AL[2], Kitch BT[2], Rashti R[2], Weiss ST[2], Lee SJ[3], Kuntz KM[3]
[1]Yale School of Medicine, New Haven, CT, USA; [2]Harvard Medical School, Boston, MA, USA; [3]Harvard School of Public Health, Boston, MA, USA

OBJECTIVE: Recent studies demonstrate the cost-effectiveness of inhaled corticosteroids (ICS) in adults. However, they fail to account for the impact of ICS-induced bone mineral density (BMD) loss and resultant hip fractures. **METHODS:** We used a previously published Markov model to compare quick relievers (e.g., b-agonists) alone vs. the addition of ICS therapy. State-space dimensions included patient age, clinical history, and lung function (FEV1% predicted). Risk functions were estimated using symptom, exacerbation, and hospitalization rates obtained from literature reviews and analyses of primary, cross-sectional data. Societal costs were derived from published economic studies of inpatient and outpatient asthma. We used published data retrieved from 3 RCTs and 3 qualified observational studies to estimate yearly change in hip BMD ranging from 0.000933g/cm^2 to –0.00058g/cm^2 per 100mcg standard ICS dosage. ICS side-effects were modeled as an annual reduction in age-predicted BMD. Risk functions to link BMD to hip fracture rates and QOL weights for hip fracture were derived from published estimates. **RESULTS:** In the absence of BMD decline, we estimated an incremental cost-effectiveness ratio of $15,000 per quality-adjusted life-year (QALY) for ICS therapy. In sensitivity analysis, we considered 3 alternative BMD decline scenarios (none; mean; high) and 4 alternative models of the temporal impact of ICS on BMD (10-, 20-, 30-year, and lifetime). Incremental cost-effectiveness ratios under various combinations of these two variables ranged from $15,000 to over $130,000/QALY. The ICS therapy strategy was dominated (i.e., it produced both higher costs and lower total QALYs) under the "high" BMD decline scenario with temporal risk greater than "30-years." **CONCLUSION:** The economic attractiveness of inhaled steroids is highly dependent upon what is assumed about their impact on BMD and the resultant fracture rate. More research is needed on these variables before definitive cost-effectiveness conclusions can be drawn.

PRP13

ASSESSING THE COST IMPLICATIONS OF COMBINED PHARMACOTHERAPY IN THE LONG TERM MANAGEMENT OF ASTHMA

Wu EQ[1], Johnson KA[2], Nichol MB[2]
[1]Analysis Group/Economics, Boston, MA, USA; [2]University of Southern California, Los Angeles, CA, USA

OBJECTIVES: We studied the cost implications of putting moderate or severe adult asthma patients on combined long-term-control drug therapy (inhaled corticosteroids + long-term-control bronchodilators) versus on inhaled corticosteroids alone. **METHODS:** The study sample was retrospectively selected from Medi-Cal eligibles between January 1995 and December 2000. The final data set included 1547 patients. The targeted asthma patient population was moderate and severe adult asthma patients who recently had an asthma-related urgent event (asthma related hospitalization or emergency care). One-year total healthcare cost was compared between the combined therapy and the monotherapy. Both the average treatment effect (ATE) and the treatment effect on the treated (TT) were estimated. A linear outcome-equation model and a propensity score method were applied to adjust for observed selectivity, and a parametric switching regression model for both observed and unobserved selection bias. Sociodemographic variables, comorbidities, previous healthcare cost, key-event type, and drug utilization were adjusted. All costs were adjusted to 1999 U.S. dollars using the medical care CPI. **RESULTS:** When adjusting only the observed selectivity using either the linear outcome-equation model or the propensity score method, we found no statistical significant difference in one-year total health care costs between the combined

therapy and the monotherapy. However, when the unobserved selectivity was also adjusted using the switching regression model, the combined therapy was less expensive (at 90% CI) in both the treated population (TT) and the general population (ATE). The TT was even less than ATE and the marginal savings would be $3150 annually. **CONCLUSIONS:** Given the combined therapy's clinical benefit shown in previous studies, it is the dominant long-term asthma-control therapy in the studied population. The difference in ATE and TT indicates that the combined therapy was given to patients whose health status could be improved the most by it.

PRP14

RATES OF ASTHMA-RELATED MEDICAL AND PRESCRIPTION RESOURCE UTILIZATION AND COSTS IN A MEDICAID POPULATION

Joshi AV[1], Smith MJ[2]
[1]West Virginia University/Pfizer Inc, Morgantown, WV, USA; [2]West Virginia University, Morgantown, WV, USA

OBJECTIVES: To assess the utilization and costs for medical resources and pharmacotherapy among patients with asthma in a state Medicaid population. **METHODS:** Outpatient, hospital and emergency department (ED) claims with a primary ICD-9 code for asthma (493.XX) dated between January 1 through December 31, 1999 were extracted from a state Medicaid claims database. Unique recipient identifiers obtained from these claims were then used to extract asthma-related prescription claims. Medicaid reimbursements were used to calculate costs for outpatient, ED and prescription drug use, and 1999 Medicare DRG reimbursement amounts provided by the Centers for Medicare and Medicaid Services (CMS) were used to calculate hospital costs. Based on the pharmacotherapy received, recipients were classified into one of four categories: 1) short-acting beta-agonist use only; 2) use of combination therapy without inhaled anti-inflammatory medications; 3) use of any inhaled anti-inflammatory therapy (inhaled corticosteroids, cromolyn, or nedocromil); or 4) no prescription claims for asthma-related medications. **RESULTS:** Overall asthma prevalence was 17.7/1000 Medicaid recipients. Of the 6051 recipients identified with asthma, 20.4% (n = 1233) received short-acting beta-agonist therapy only, 34.8% (n = 2108) received combination therapy without inhaled anti-inflammatory drugs, 35.9% (n = 2170) received at least one inhaled anti-inflammatory drug, and 8.9% (n = 540) had no prescription claims for asthma-related medications. The hospitalization rate was 21 hospitalizations/10,000 recipients at a mean cost of $3737 (SD = $1322) per visit per recipient (pvpr). The rates of outpatient and ED use were 21 outpatient visits/1000 recipients, and 69 ED visits/10,000 recipients. The mean cost pvpr for outpatient and ED use was $54 (SD = $72) and $101 (SD = $126), respectively. The total asthma-related expenditures to Medicaid were: $2,690,777 for hospitalizations; $236,857 for ED use; $589,878 for outpatient use; and $1,813,240 for prescription use. **CONCLUSIONS:** Asthma is responsible for a substantial economic burden to Medicaid, with hospital use accounting for most of the dollars.

PRP15

RELATIONSHIP BETWEEN ADHERENCE RATE AND TOTAL MEDICAL AND DRUG COSTS

Peterson AM, Ceccanecchio D, McGhan WF
Philadelphia College of Pharmacy, Philadelphia, PA, USA

OBJECTIVES: Asthma patients' lack of adherence to inhaled corticosteroids (IC) contributes to treatment failure and over $6.2 billion in associated costs. In disease states such as hypertension, adherence rates ≥80% are related to clinical success. Similar adherence rates for IC in asthma patients have not yet been determined. This study was designed to assess the relationship between IC adherence rate and Total Medical and Drug Costs (TMDC). **METHODS:** Data were from a commercial, integrated pharmacy/medical claims database. Patients ranging from 4 to 55 years with at least 2 claims for an IC, a 120-day benefit history, and a 360-day continuous enrollment were included. Patients were excluded if they were also coded for non-asthma-related pulmonary diseases. Age, gender, and concomitant drug/disease information were collected. The adherence rate was defined as [Total days supply of IC/(last RX date less first RX date + last days supply)]. TMDC included drug, hospital, physician visit and lab costs. The number of Disease Related Events (DRE) was also determined. ANOVA or equivalent tests, along with multiple regression techniques were used to test hypotheses. **RESULTS:** Six hundred forty-three patients were identified. The mean age was 30.5 ± 15.8, with 43.5% males. We classified 8.5% of patients as 80–99% adherent, 8.2% between 60–79% adherent, 14.9% between 40–59% adherent, and 70.6% of patients were 39% adherent. There was no significant difference in the TMDC among adherence quintiles. The regression demonstrated a statistically significant correlation ($r = 0.76$) between age ($p < 0.0001$), number of medications ($p < 0.0001$), co-morbidities ($p < 0.0001$), use of budesonide inhaler ($p = 0.0081$) or long-acting beta agonists ($p = 0.0017$) against the log of TMDC. There were no items inversely correlated to TMDC. There was no difference in DRE between patients <80% or ≥80% adherent. ($c2 = 0.3511$, 1 d.f., $p = 0.5535$). **CONCLUSION:** Based on this study, there was not significant linear correlation between adherence to IC and TMDC.